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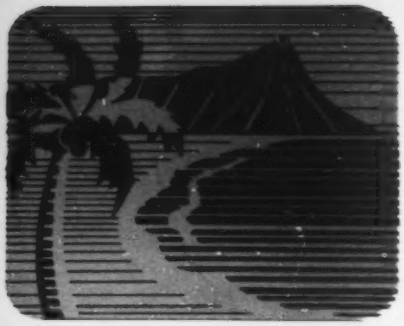

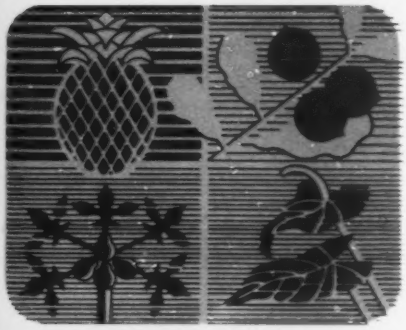

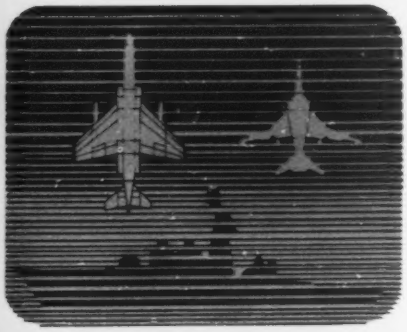

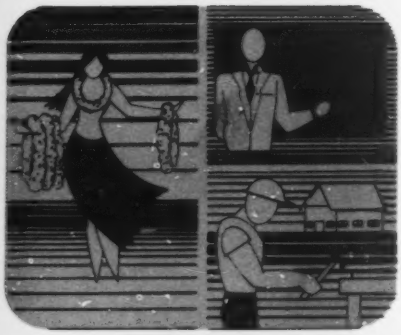

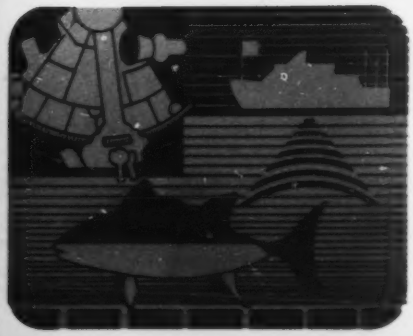

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DEPARTMENT OF BUSINESS AND ECONOMIC DEVELOPMENT

POPULATION AND ECONOMIC PROJECTIONS FOR THE STATE OF HAWAII TO 2010 (Series M-K)

Research and Economic Analysis Division

November 1988

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I. Introduction

This report summarizes newly revised economic and population projections for Hawaii designated series "M-K," prepared by the Department of Business and Economic Development for use by State and County agencies and the business community. Additional information on methods and results will be compiled into technical reports which will be available in the near future.

The present series replace an earlier set published by DBED in 1984. The previous projections, labeled "M-F" covered the 25-year period between 1980 and 2005. 1/ Updated tourism projections and the need for projections running at least as far as 2010 have since prompted a review and update of the 1984 projections. The new projections contained in this report, designated series "M-K," do not drastically alter the trends foreseen in the M-F series. They do, however, provide more current expectations about the future course of tourism and, moreover, extend the analysis through the first decade of the 21st century.

The projections are designed to be as objective as possible. This means that assumptions upon which the projections are based have been chosen on the basis of their likelihood, not their level of desirability. Likewise, the relationships within the forecasting model which translate assumptions into projections of the future are based, as much as possible, on objective analysis of past and current trends. The projections, therefore, do not necessarily represent preferred levels of future economic activity or population. Rather, they represent only the most likely future given the state of knowledge about the economic and demographic factors at work.

It is also very important to note that the projections do not represent either a certain or unalterable future. They are not certain because there will obviously be some error involved in forecasting 20 years or more into the future, as the result of both unanticipated future events and limitations of the forecasting techniques available. Moreover, if the projections suggest future conditions which the community determines to be undesirable, policies can be formulated to help bring about a more desirable future; thus, the projections, regardless of their potential accuracy, are not unalterable. Notwithstanding these limitations, it must be cautioned that these projections have embodied the established trends of some very powerful economic and demographic forces, which are not subject to either easy or rapid manipulation.

1/ Early in 1988, DBED circulated, for limited distribution and comment, a set of preliminary M-K series projections. Refinements have resulted in the slightly different set of final M-K series projections contained in this report. Thus, the earlier projections are obsolete.

II. Major Findings

The new projections indicate continued growth in both the population and economy of the State, although at a somewhat reduced rate compared with the rapid increases of the past quarter of a century. The resident population, which includes members of the armed forces and their dependents but excludes visitors, is projected to rise from 1,051,500 in mid-1985 to 1,435,500 in 2010. The de facto population, which includes visitors present but excludes residents temporarily absent, is projected to grow from 1,149,600 in 1985 to 1,674,200 in 2010 (Table 1).

The M-K projections anticipate that population increases on the Neighbor Islands will be proportionately greater. The resident total on Oahu is projected to rise 23 percent, from 811,100 in 1985 to 999,500 in 2010. The Neighbor Island total, by contrast, is projected to rise 81 percent over the 1985 to 2010 period, from 240,400 to 435,900. All three Neighbor Island counties share in this expansion. Nevertheless, Oahu would still account for 70 percent of the State resident total in 2010 under the projections, down from 77 percent in 1985 (Table 2).

Because of the continued growth projected for the visitor industry and its expansion to the Neighbor Islands, the de facto populations of Hawaii, Kauai, and Maui Counties are projected to approximately double in size from 1985 to 2010. Oahu de facto population is expected to increase 27 percent, to 1,094,700 in 2010.

Diminished birth rates and longer life expectancy will inevitably produce an aging of the population, with the median age rising from 30.5 years in 1985 to 35.3 years in 2010. The population under 15 years of age is projected to fall from 22.9 percent of the total to 19.6; during the same quarter of a century, persons 65 years old and over are projected to rise from 9.4 percent of the total to 13.1. The sex ratio, 104.1 males per 100 females in 1985, would decline to 101.4 by 2010 under the new projections (Table 3).

The civilian job count which was 473,100 in 1985 is projected to increase to 720,600 by 2010. Two of today's major industries, sugar and pineapple, are expected to decline in employment, while manufacturing and Federal government are expected to achieve only modest gains. Employment in trade, services, and diversified agriculture, however, are expected to show continued rapid increases (Table 4).

Income projections reveal significant growth, although less so on a per capita basis. Projected increases for personal income amount to 85 percent over the 1985 to 2010 period. Per capita personal income is projected to rise from $12,400 in 1985 to $16,800 (in 1982 dollars) in 2010, or 35.5 percent.

Gross State Product, the value of all goods and services produced in Hawaii, is projected to grow to $30.5 billion (in 1982 dollars), approximately double the 1985 estimate.

Details of the population and economic projections by counties are shown in Table 5 to Table 8.

Table 1
POPULATION ESTIMATES AND PROJECTIONS, RESIDENT AND DE FACTO, BY MILITARY AND RESIDENCE STATUS: 1970 TO 2010

[Series M-K]

Year	Resident population 1/		De facto population 2/	
	Total	Excluding armed forces and dependents	Total	Visitors present
Population (in thousands):				
1970	771.6	660.1	798.6	36.9
1975	886.2	763.7	943.5	66.3
1980	968.9	846.9	1,055.8	96.5
1985	1,051.5	930.5	1,149.6	116.7
1990	1,137.2	1,016.8	1,269.1	152.0
1995	1,225.2	1,104.8	1,382.3	178.6
2000	1,285.1	1,164.7	1,468.6	206.0
2005	1,350.8	1,230.4	1,560.3	233.1
2010	1,435.5	1,315.1	1,674.2	263.7
Average annual percent change:				
1970-1975	2.8	3.0	3.4	12.4
1975-1980	1.8	2.1	2.3	7.8
1980-1985	1.6	1.9	1.7	3.9
1985-1990	1.6	1.8	2.0	5.4
1990-1995	1.5	1.7	1.7	3.3
1995-2000	1.0	1.1	1.2	2.9
2000-2005	1.0	1.1	1.2	2.5
2005-2010	1.2	1.3	1.4	2.5

1/ As of July 1. The resident population is defined as the number of persons whose usual place of residence is in an area, regardless of physical location on the census or estimate date. It includes armed forces stationed or homeported in an area but excludes persons of local origin attending school or in military service outside the area.

2/ The de facto populaton is defined as the number of persons physically present in an area, regardless of usual place of residence. It includes visitors present but excludes residents temporarily absent. The resident population is based on July 1 estimates; visitors presents and residents absent are based on calendar year averages.

Table 2
POPULATION ESTIMATES AND PROJECTIONS, RESIDENT AND DE FACTO BY COUNTIES: 1970 TO 2010

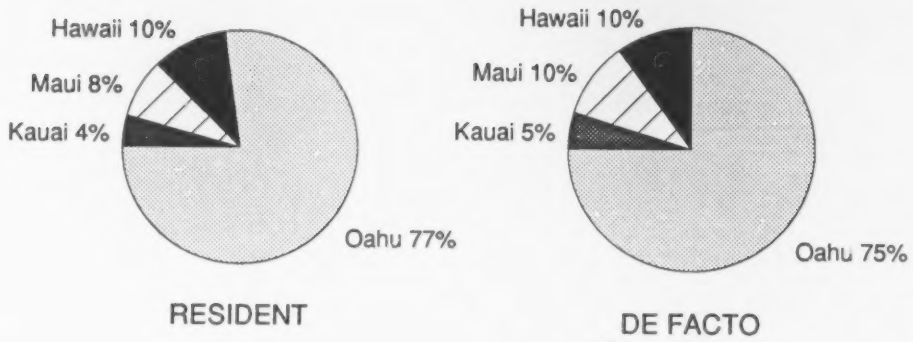
[In thousands]

Type of population and year	State total	City & County of Honolulu	Other counties			
			Total	Hawaii	Kauai	Maui
Resident population						
1970	771.6	631.6	140.1	63.8	29.8	46.5
1975	886.2	718.6	167.5	77.4	33.3	56.8
1980	968.9	764.8	204.1	93.0	39.4	71.6
1985	1,051.5	811.1	240.4	109.5	45.4	85.5
1990	1,137.2	861.6	275.6	124.6	54.1	96.8
1995	1,225.2	910.4	314.9	142.5	61.1	111.2
2000	1,285.1	932.8	352.4	160.4	68.2	123.9
2005	1,350.8	961.1	389.7	180.8	75.5	133.4
2010	1,435.5	999.5	435.9	206.1	84.6	145.2
De facto population:						
1970	798.6	650.2	148.4	66.6	32.3	49.4
1975	943.5	757.1	186.4	83.3	38.1	65.1
1980	1,055.8	823.6	232.2	99.5	46.4	86.4
1985	1,149.6	861.6	288.1	116.1	56.2	115.7
1990	1,269.1	928.0	341.2	134.4	70.1	136.7
1995	1,382.3	983.1	399.2	158.6	81.7	159.0
2000	1,468.6	1,012.5	456.1	183.0	94.0	179.1
2005	1,560.3	1,048.5	511.9	211.0	104.8	196.0
2010	1,674.2	1,094.7	579.5	243.0	120.3	216.2

Figure 1.

DISTRIBUTION OF RESIDENT AND DE FACTO POPULATION BY COUNTIES: 1985 AND 2010

1985



2010

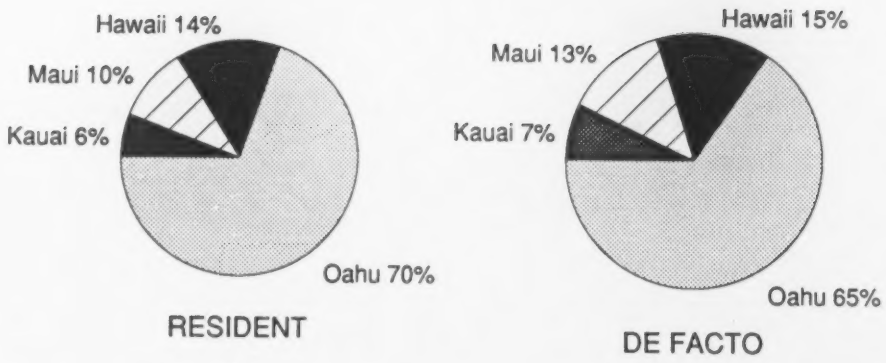


Table 3
RESIDENT POPULATION PROJECTIONS BY AGE AND SEX: 1985 TO 2010

[In thousands]

Age in years	1985			1990			1995		
	Total	Male	Female	Total	Male	Female	Total	Male	Female
Total.....	1,051.5	536.2	515.3	1,137.2	577.7	559.5	1,225.2	620.2	605.0
0-4.....	90.6	46.6	44.0	86.9	44.6	42.2	87.8	45.1	42.7
5-9.....	77.9	40.0	37.8	91.5	46.5	45.0	88.1	44.8	43.2
10-14.....	72.7	37.5	35.3	77.9	39.9	38.0	92.3	46.5	45.8
15-19.....	79.2	40.8	38.4	80.7	44.1	36.6	86.0	46.5	39.4
20-24.....	96.0	54.1	41.9	103.5	58.6	44.9	105.7	62.3	43.4
25-29.....	99.8	51.8	48.0	89.0	44.9	44.1	97.1	49.9	47.2
30-34.....	97.1	49.2	47.8	100.5	51.1	49.4	90.7	44.9	45.8
35-39.....	84.7	42.8	41.9	95.3	48.1	47.2	99.9	50.4	49.5
40-44.....	63.4	31.4	31.9	83.0	41.5	41.5	93.8	47.0	46.9
45-49.....	47.2	22.6	24.6	62.3	30.5	31.8	82.4	40.8	41.6
50-54.....	45.8	21.8	24.0	46.6	22.0	24.6	61.7	30.0	31.7
55-59.....	50.3	25.1	25.2	45.9	21.8	24.2	46.6	21.8	24.8
60-64.....	48.3	24.2	24.1	48.9	24.0	24.9	45.4	21.2	24.2
65-69.....	36.6	18.0	18.5	45.8	22.5	23.2	46.6	22.4	24.2
70-74.....	26.5	13.4	13.1	33.4	16.0	17.4	41.8	20.0	21.8
75-79.....	17.5	9.3	8.2	22.7	11.1	11.6	28.8	13.3	15.5
80-84.....	10.1	4.6	5.4	13.8	6.8	7.0	17.9	8.1	9.8
85+.....	7.9	2.8	5.1	9.6	3.6	6.0	12.6	5.1	7.4
Median age.	30.5	29.7	31.3	31.9	31.0	32.9	33.1	31.7	34.4

Continued on next page.

Table 3
RESIDENT POPULATION PROJECTIONS BY AGE AND SEX: 1985 TO 2010 - Con.

[In thousands]

Age in years	2000			2005			2010		
	Total	Male	Female	Total	Male	Female	Total	Male	Female
Total	1,285.1	648.8	636.3	1,350.8	680.8	670.0	1,435.5	722.6	712.8
0- 4	88.4	45.5	43.0	92.1	47.3	44.7	97.9	50.4	47.6
5- 9	86.9	44.5	42.4	88.3	45.1	43.2	93.7	47.6	46.1
10-14	86.9	44.0	42.9	86.3	43.9	42.3	89.2	45.2	44.0
15-19	98.2	51.8	46.4	93.7	49.9	43.9	95.0	51.0	44.0
20-24	108.1	63.1	45.0	121.3	68.9	52.4	119.2	68.4	50.8
25-29	96.1	51.8	44.3	99.7	53.1	46.5	115.4	60.4	55.0
30-34	95.8	48.4	47.4	95.8	50.7	45.0	101.8	53.2	48.6
35-39	88.1	43.3	44.8	93.6	47.0	46.6	95.2	50.1	45.1
40-44	96.9	48.5	48.4	85.7	41.7	44.1	92.6	46.1	46.5
45-49	92.0	45.6	46.4	95.4	47.3	48.1	85.2	41.0	44.2
50-54	80.9	39.7	41.1	90.6	44.6	46.0	94.4	46.4	48.0
55-59	60.5	29.2	31.3	79.6	38.9	40.8	89.9	43.9	46.0
60-64	45.4	21.0	24.4	59.0	28.1	30.9	77.9	37.6	40.3
65-69	43.0	19.7	23.3	43.3	19.7	23.6	56.4	26.4	30.0
70-74	42.4	19.8	22.6	39.4	17.6	21.9	40.0	17.6	22.3
75-79	36.1	16.6	19.5	36.8	16.5	20.2	34.3	14.7	19.6
80-84	22.8	9.8	13.0	28.8	12.4	16.4	29.5	12.3	17.2
85+	16.5	6.5	10.0	21.6	8.2	13.4	27.8	10.3	17.5
Median age	34.1	32.5	35.8	34.9	33.2	36.8	35.3	33.6	37.2

Figure 2.

RESIDENT POPULATION, BY AGE, SEX, AND MILITARY STATUS: 1985 AND 2010

(in thousands)

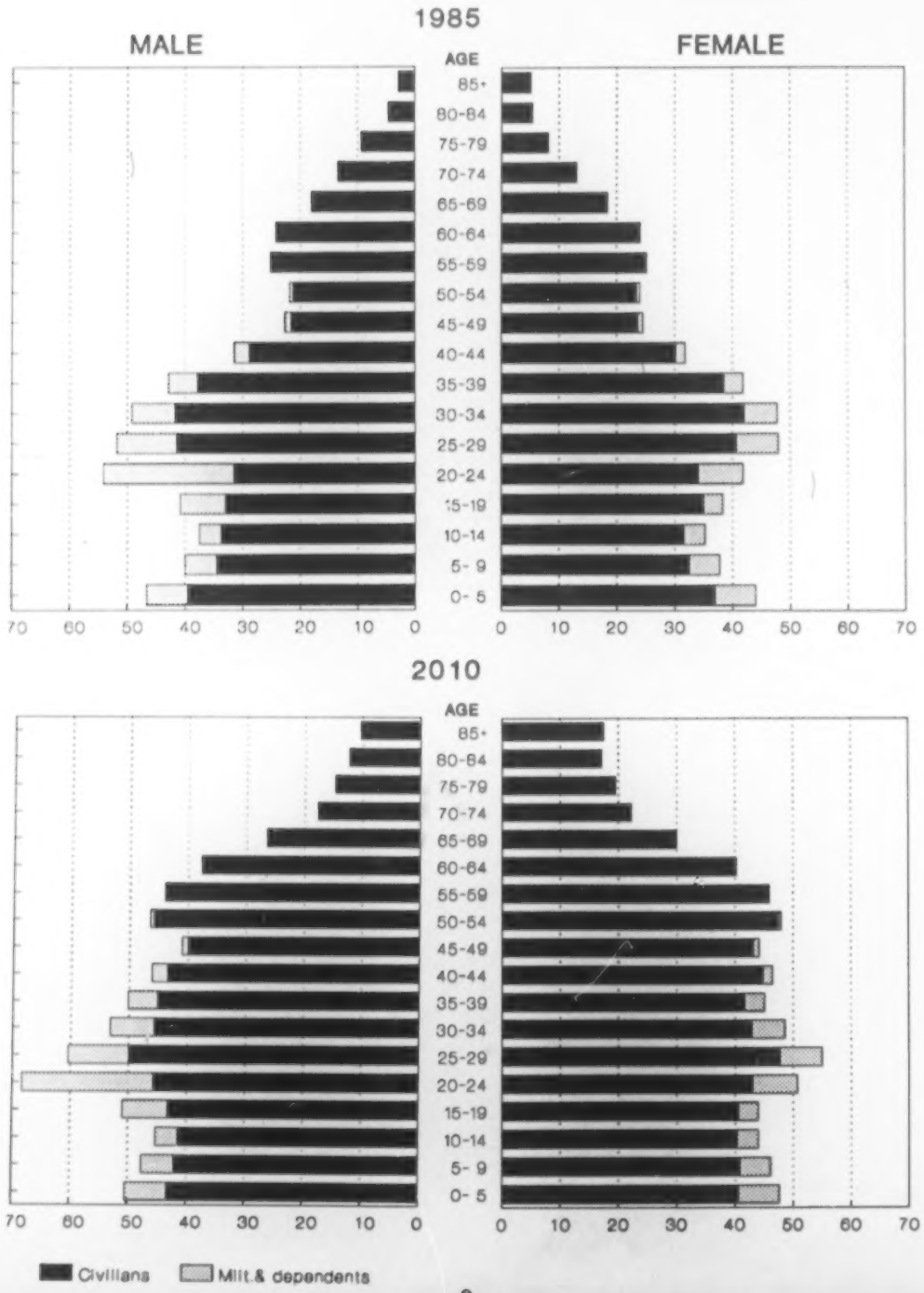


Table 4
STATE POPULATION AND ECONOMIC PROJECTIONS: 1985 TO 2010

[In thousands]

Subject	1985	1990	1995	2000	2005	2010
Resident population	1,051.5	1,137.2	1,225.2	1,285.1	1,350.8	1,435.5
De facto populaton	1,149.6	1,269.1	1,382.3	1,468.6	1,560.3	1,674.2
Total labor force	537.4	602.2	657.5	704.9	741.9	780.2
Civilian labor force	479.0	543.8	599.1	646.5	683.4	721.7
Civilian persons employed	452.0	516.7	568.6	614.0	649.5	686.3
Total jobs	541.5	611.0	665.5	713.1	750.4	789.1
Military jobs	68.4	68.4	68.4	68.4	68.4	68.4
Civilian jobs	473.1	542.6	597.0	644.7	682.0	720.6
Self-employed	36.9	42.3	46.6	50.3	53.2	56.2
Wage and salary jobs	436.2	500.2	550.5	594.4	628.8	664.4
Sugarcane - field	4.1	3.6	3.2	2.8	2.5	2.2
Pineapple - field	2.0	1.9	1.9	1.8	1.7	1.7
Other agriculture	4.4	5.4	6.3	7.1	7.8	8.6
Sugarcane processing	3.5	3.1	2.7	2.4	2.1	1.8
Pineapple canning	1.9	1.7	1.6	1.4	1.3	1.2
Other food processing	4.7	5.2	5.6	5.9	6.0	6.1
Misc manufacturing	11.9	12.7	13.3	13.9	14.5	15.0
Construction	17.2	21.2	23.3	25.0	26.1	27.1
Transp,warehousing	23.4	26.2	28.3	29.8	30.9	31.9
Communication	7.4	8.5	9.1	9.7	10.0	10.3
Utilities	2.5	2.7	2.8	2.9	3.0	3.0
Wholesale trade	19.6	22.5	24.5	26.3	27.4	28.3
Retail trade	56.0	65.9	73.3	80.0	85.6	91.6
Eating & drnk places	40.1	48.1	52.7	57.3	61.4	65.9
Banking & finance	31.9	35.4	39.2	41.6	42.9	44.5
Hotels	29.0	34.5	38.1	41.3	43.7	46.3
Health,prof services	34.4	42.4	49.7	55.8	61.0	66.6
Other services	49.2	61.1	71.5	80.7	88.4	96.7
State-local gov	60.9	65.8	70.7	75.3	78.8	81.4
Federal gov	32.4	32.5	32.9	33.3	33.7	34.1
Personal income (millions of 1982 dollars)	13,045	15,509	17,994	20,094	21,920	24,122
Per capita income (thousands of 1982 dollars)	12.4	13.6	14.7	15.6	16.2	16.8
Disposable personal income (millions of 1982 dollars)	11,297	13,311	15,441	17,241	18,806	20,694
Gross State Product (millions of 1982 dollars)	15,132	18,345	21,670	24,720	27,469	30,418

Table 5
POPULATION AND ECONOMIC PROJECTIONS FOR THE CITY & COUNTY OF HONOLULU: 1985 TO 2010

[In thousands]

County and variable	1985	1990	1995	2000	2005	2010
Resident population	811.1	861.6	910.4	932.8	961.1	999.5
De facto population	861.6	928.0	983.1	1,012.5	1,048.5	1,094.7
Civilian jobs	369.7	417.1	450.2	476.3	494.1	511.2
Wage and salary jobs	345.1	388.7	418.9	442.6	458.4	473.4
Agriculture	2.7	2.7	2.8	2.8	2.9	2.9
Manufacturing	15.9	16.6	17.0	17.4	17.5	17.8
Construction	14.1	17.2	18.6	19.5	20.0	20.3
Transp., com., utilities	27.1	29.6	31.3	32.3	32.7	33.1
Trade(excl. e&d)	60.2	70.2	75.9	80.5	83.6	86.7
Eating & drinking	31.7	36.6	38.5	40.1	41.2	42.2
Banking, finance	27.0	29.5	32.0	33.4	34.1	34.8
Services	87.3	104.8	118.6	129.6	138.0	146.7
Hotels	16.1	17.9	18.7	19.0	19.0	19.0
Other services	71.2	86.9	99.9	110.6	119.0	127.7
Government	79.0	81.5	84.4	86.9	88.4	89.0
State/local	47.9	50.1	52.7	54.8	55.9	56.1
Federal	31.2	31.3	31.8	32.2	32.5	32.9
Self-employed	24.8	28.4	31.2	33.7	35.7	37.7
Personal income (millions of 1982 dollars)	10,566	12,356	14,072	15,408	16,495	17,786
Per capita income (thousands of 1982 dollars)	13.0	14.3	15.5	16.5	17.2	17.8

Table 6
POPULATION AND ECONOMIC PROJECTIONS FOR HAWAII COUNTY: 1985 TO 2010

[In thousands]

County and variable	1985	1990	1995	2000	2005	2010
Resident population	109.5	124.6	142.5	160.4	180.8	206.1
De facto population	116.1	134.4	158.6	183.0	211.0	243.0
Civilian jobs	42.4	50.8	59.3	68.2	78.3	89.8
Wage and salary jobs	35.7	43.1	50.8	59.0	68.6	79.5
Agriculture	3.5	3.7	3.8	3.9	4.0	4.1
Manufacturing	2.8	2.7	2.8	2.8	2.9	2.9
Construction	1.3	1.6	1.9	2.2	2.5	2.9
Transp., com., utilities	2.1	2.6	3.0	3.4	3.9	4.5
Trade(excl. e&d)	6.4	7.3	8.5	9.9	11.5	13.3
Eating & drinking	2.7	3.8	5.0	6.3	8.0	9.9
Banking, finance	1.5	1.7	1.9	2.2	2.6	3.0
Services	8.8	11.6	14.6	17.7	21.2	25.3
Hotels	4.0	5.2	6.3	7.4	8.7	10.2
Other services	4.9	6.5	8.3	10.2	12.4	15.1
Government	6.9	8.1	9.3	10.6	12.0	13.6
State/local	6.3	7.5	8.7	9.9	11.4	13.0
Federal	0.7	0.6	0.7	0.7	0.7	0.7
Self-employed	6.7	7.7	8.5	9.2	9.7	10.2
Personal income (millions of 1982 dollars)	1,064	1,328	1,643	1,965	2,342	2,812
Per capita income (thousands of 1982 dollars)	9.7	10.7	11.5	12.3	13.0	13.6

Table 7
POPULATION AND ECONOMIC PROJECTIONS FOR KAUAI COUNTY: 1985 TO 2010

[In thousands]

County and variable	1985	1990	1995	2000	2005	2010
Resident population	45.4	54.1	61.1	68.2	75.5	84.6
De facto population	56.2	70.1	81.7	94.0	104.8	120.3
Civilian jobs	19.9	25.3	29.8	34.2	38.1	42.5
Wage and salary jobs	18.0	23.1	27.4	31.6	35.4	39.6
Agriculture	1.3	1.5	1.7	1.8	2.0	2.2
Manufacturing	1.3	1.3	1.3	1.3	1.3	1.3
Construction	0.6	0.8	0.9	1.1	1.2	1.4
Transp., com., utilities	1.9	2.4	2.8	3.1	3.4	3.6
Trade(excl. e&d)	2.8	3.6	4.5	5.4	6.2	7.1
Eating & drinking	1.9	2.4	2.9	3.4	4.0	4.6
Banking, finance	0.9	1.1	1.3	1.5	1.6	1.8
Services	4.7	6.7	8.0	9.4	10.7	12.2
Hotels	2.5	3.4	4.0	4.5	5.0	5.6
Other services	2.3	3.2	4.0	4.9	5.7	6.6
Government	2.8	3.5	4.0	4.5	5.0	5.4
State/local	2.5	3.3	3.8	4.3	4.8	5.2
Federal	0.3	0.2	0.2	0.2	0.2	0.2
Self-employed	1.9	2.2	2.4	2.6	2.7	2.9
Personal income (millions of 1982 dollars)	460	630	790	945	1,094	1,277
Per capita income (thousands of 1982 dollars)	10.1	11.6	12.9	13.9	14.5	15.1

Table 8
POPULATION AND ECONOMIC PROJECTIONS FOR MAUI COUNTY: 1985 TO 2010

[In thousands]

County and variable	1985	1990	1995	2000	2005	2010
Resident population	85.5	96.8	111.2	123.9	133.4	145.2
De facto population	115.7	136.7	159.0	179.1	196.0	216.2
Civilian jobs	41.1	49.4	57.8	66.0	71.4	77.2
Wage and salary jobs	37.6	45.4	53.3	61.2	66.3	71.8
Agriculture	3.0	3.1	3.1	3.1	3.2	3.2
Manufacturing	2.1	2.0	2.1	2.1	2.1	2.1
Construction	1.3	1.6	1.9	2.2	2.4	2.6
Transp., com., utilities	2.3	2.7	3.2	3.6	3.8	4.1
Trade(excl. e&d)	6.0	7.2	8.8	10.4	11.6	12.8
Eating & drinking	4.0	5.3	6.3	7.5	8.3	9.2
Banking, finance	2.6	3.2	3.9	4.4	4.7	4.9
Services	11.8	14.9	18.0	21.1	23.2	25.4
Hotels	6.5	7.9	9.1	10.3	10.9	11.6
Other services	5.3	7.0	8.9	10.8	12.2	13.9
Government		4.6	5.2	5.9	6.6	7.1 7.5
State/local	4.3	4.9	5.6	6.3	6.8	7.2
Federal		0.4	0.3	0.3	0.3	0.3 0.3
Self-employed	3.6	4.1	4.5	4.8	5.1	5.4
Personal income (millions of 1982 dollars)	953	1,196	1,489	1,776	1,989	2,248
Per capita income (thousands of 1982 dollars)	11.1	12.4	13.4	14.3	14.9	15.5

III. The Projection Methods

The M-K projections were produced through the Hawaii Population and Economic Projection and Simulation Model, a system of mathematical equations designed to give a consistent set of State and County projections. At the center of the system is the State model, which forecasts expenditures, production, employment, income, and population. The State model uses projections of U.S. productivity and wage rates, and other variables, produced in turn by other economic models maintained by the UCLA Business Forecasting Project, the U.S. Bureau of Economic Analysis, and other agencies. A County model, in turn, allocates the State forecasts of population, employment, and income among the four counties.

State Model

The State model contains two major component submodels. An economic submodel produces projections of economic activity ranging from jobs in individual industries, wages, and personal income to Gross State Product. A demographic submodel generates the natural increase in population based on demographic factors such as births and deaths. The interaction between the economic and demographic models determines the expected level of net migration, which is added to the natural growth of the population resulting from births and deaths.

The entire model is relatively large with roughly 200 economic and demographic relationships depicted in the equations. Yet, despite its size, the model is based on fairly straightforward concepts of regional growth. Central to these concepts is the view that a region's exports (purchases of locally produced goods and services by outsiders) are the driving force of regional economic activity. In Hawaii, the principle exports are visitor services, national defense activity, and agriculture.

When supplied with assumptions about the level of these exports in the future, the economic submodel can trace and predict the economic growth impact which these exports will likely have within the local economy. This includes the impacts on industries doing the exporting, the impacts on other industries which supply services and materials to the primary export industries, and what all this activity will probably generate in terms of overall employment and income for all industries and the State as a whole.

Another basic concept in regional economics is that ultimately it is long-term economic activity that determines the level of population in a particular region. To be sure, there is a "natural" increase in the population which may be relatively independent of long-term economic conditions. This natural increase is the net increase from births less the number of deaths in a given period. However, people can and do migrate between regions relatively easily. Regions in which the natural increase in population cannot supply the labor demanded by economic growth will tend to experience in-migration. Regions in which economic growth is inadequate to support the natural growth rate of population will tend to experience a net outflow of population. Thus, if the natural increase in Hawaii's population, as projected by the demographic submodel is inadequate to meet the economic submodel's projection of economic activity, increased net in-migration will be projected until the gap in labor supply and demand is closed.

The County Model

The County model distributes the State forecasts of population, employment, and income among the four Counties.

Like the State model, the model for the Counties is based on the concept that the growth of the Counties' exports and their important import replacement activity (which together are called "basic" activity) is the primary influence on the growth of the Counties' economies and populations in general. However, in contrast to the information available for the State as a whole,

there are no data bases or relationships available for the Counties that reliably measure dollar values for County exports and imports, or county-specific multipliers to distribute the impact of export sales. Therefore, county employment by industry is used as a substitute basis for measuring most economic activity at the county level.

The key export industry for all counties is tourism. However, in the absence of reliable and comprehensive visitor statistics for the Counties, the magnitude of county tourism is reflected best by the number of occupied visitor accommodations and the level of employment in hotel and eating and drinking establishments. Each county is independently allocated a share of the statewide projection for occupied hotel rooms based on analysis of past, current, and expected future trends in resort development and occupancy rates. Visitor accommodations projections are then translated into levels of hotel and eating and drinking establishment employment.

Employment in Federal government activity is also allocated independently among the Counties based on past trends and future prospects for defense and civilian federal activity.

With these key independent industry projections, the county submodel projects employment in other, nonbasic industries which primarily serve the local population by comparing historical relationships and changes in the relationship of county economic activity to State economic activity for particular industries.

Forecasts of county population and personal income are then derived from projections of total employment.

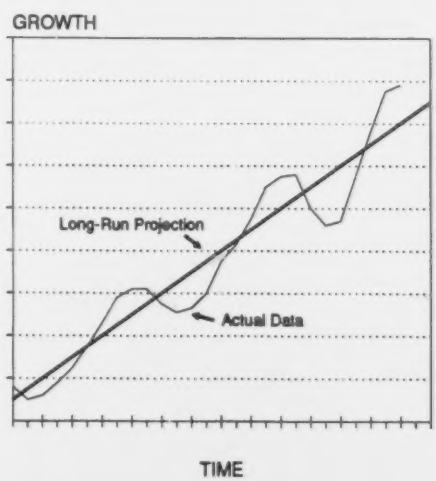
Error in Long-Run Projections

Long-term projections or forecasts attempt to estimate basic economic trends many years into the future in order to assist in the planning of programs and policies that require many years of lead time. However, in long-term forecasting, it is impossible to accurately predict economic measures for specific years or what phase of a business cycle will prevail in a given year. For instance, a forecast of U.S. GNP for the year 2020 would have to accurately forecast the duration of each business cycle to 2020 (there could be 5 to 10 cycles over the 30 years), and then determine the severity of that portion of the business cycle occurring in 2020--an all but impossible task.

Therefore, rather than predict economic values for particular years, long-term projections concentrate on establishing the long-term average trend in economic variables. The projected value of the economic variable for each year of a long-term forecast will differ from the actual value by both the error in the long-term forecast and by the particular phase of the business cycle for each year.

These points are illustrated in Figures 3 and 4. In Figure 3, a straight line representing projected growth is crossed at several points by the actual growth line in a cyclical pattern. Only in a few of the years represented do the actual and projected values coincide. In all other years, the actual value falls above or below the projected value. However, the long-term forecast does appear to accurately represent the actual growth of the variable on an overall basis.

Figure 3
REPRESENTATION OF AN ACCURATE LONG-RUN PROJECTION

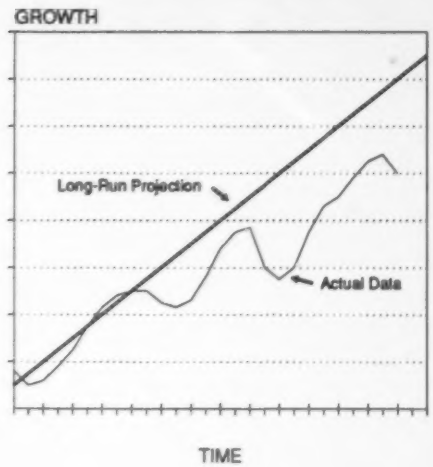


In Figure 4, the straight line forecast is close to the actual trend line in the first half of the forecast period but is noticeably above the actual trend after that. In this case, the actual and projected values differ both because of cycles varying from the long-term trend and because of a faulty trend forecast.

In the M-K projections, the growth trend of population and economic variables are projected for the 25-year period from 1985 to 2010. Like the illustration in Figure 3, it is not expected that actual population and economic values in a given year will match those projected except for a few particular years over the period. It is hoped that the projections accurately reflect the long-run average growth rates of the population and the economy.

Because of the growth period in the late 1980s, it would not be surprising to find actual values for economic variables to be above the long-run forecast trend. It is not important that they be on the trend line, nor would it necessarily mean the projections are faulty if the actual values were to remain above the projected level through 1990. What is important to the validity of the projections is that the actual values eventually meet or fall below the trend line within the projection period so that the overall average would correspond to the projected long-run average growth.

Figure 4
REPRESENTATION OF AN ERRONEOUS LONG-RUN PROJECTION



IV. Projection Assumptions

As indicated earlier, exports from the State are considered to be the driving force in producing overall economic and population projections. Projections for exports are determined outside of the model and are referred to as "exogenous" variables. A number of these exogenous variables, such as visitor and defense projections, are derived, in turn, from other special models or mathematical estimating techniques.

Tourism

Table 9 presents revised assumptions for key tourism supply and demand factors to 2010. Recent econometric work by DBED and its special consultant for the econometric model program determined that the likely future growth rate for tourism in Hawaii is higher than previously thought. Consequently, instead of visitor arrival rates leveling off at an average annual one percent increase in the 2000 to 2005 period as in the previous M-F series, the M-K series anticipates a leveling off of the growth rate to an annual average 2.5 percent growth. Thus, from a level of 4.9 million visitors in 1985, the M-K projections anticipate 9.0 million visitors by the year 2000, 10.2 million by 2005, and 11.5 million by 2010. By comparison, the previous M-F series projections anticipated 7.8 million visitors by 2000 and 8.2 million by 2005, the final year for projections in that series.

The higher levels of Neighbor Island tourism in the revised projections primarily reflect the higher level of tourism projected for the State over the projection period. However, some re-adjustment of the share of tourism by county has resulted in marginal changes. The distribution of projected tourism by county depends primarily on projections of the distribution of occupied visitor rooms among the Counties. The projected distribution of occupied hotel and condominium units between Oahu and the Neighbor Islands are based upon a well established and consistent long-term trend and remains unchanged from the previous M-F series. From 1985 to 2010, it is projected that Oahu's share of occupied visitor rooms will decline from 62 to 45 percent. Likewise, the Neighbor Island share is projected to increase from 38 to 55 percent in 2010. Due to a somewhat higher projected occupancy rate on Oahu, the revised projections anticipate a declining Oahu share of total visitor rooms (occupied plus unoccupied) from 59 percent in 1985 to about 42 percent of the State total in 2010, while the Neighbor Islands' combined share increases from 41 percent to 58 percent over the period.

Hawaii County's share of total Statewide visitor rooms for 2010 is projected to be 20 percent in the new M-K projection. For Kauai, the share increases to 13 percent, while for Maui, the share increases to 25 percent of total State visitor rooms under the M-K projections.

Defense Expenditures

Defense expenditures in Hawaii fall into three primary categories: military personnel pay, civilian worker pay, and the local purchase of goods and services including construction. Under the previous M-F projections, it was assumed that defense expenditures would increase at an average real rate of about 2 percent per year over the projection period. This was based on the expectation that the total military presence would remain relatively constant in terms of military and civilian employment, with modest real increases in average pay and a trend towards more capital-intensive activities which would also result in modest increases in real expenditures for local procurement. More recent examination of past trends continues to suggest that the overall military presence will remain relatively constant in terms of employment, but that real increases in construction and local purchases (i.e., beyond increases needed to keep up with inflation) will grow more slowly, if at all. Consequently, the overall real growth rate for defense spending in Hawaii over the projection period of the M-K series is

Table 9
VISITOR INDUSTRY PROJECTIONS: 1985 TO 2010

[In thousands]

Subject	1985	1990	1995	2000	2005	2010
Visitor arrivals	4,884	6,521	7,746	8,979	10,159	11,494
Non-Japanese	4,029	5,087	5,887	6,734	7,619	8,620
Japanese	855	1,435	1,859	2,245	2,540	2,874
Visitor and crew expenditures ($82 million)	4,210	6,070	7,324	8,556	9,680	10,952
Non-Japanese	3,264	3,918	4,535	5,189	5,871	6,642
Japanese	946	2,152	2,788	3,367	3,810	4,310
Average visitor census	116.7	152.0	178.7	206.0	233.1	263.7
Oahu	65.3	82.1	89.3	96.8	104.9	113.4
Hawaii County	8.0	11.4	17.9	24.7	32.6	39.6
Kauai County	11.5	16.7	21.4	26.8	30.3	36.9
Maui County	31.9	41.8	50.0	57.7	65.3	73.8
Occupied hotel units 1/	50.8	60.8	71.5	82.4	93.2	105.5
Oahu	31.6	35.3	38.6	42.0	44.8	47.5
Hawaii County	4.3	6.1	8.6	11.5	14.9	19.0
Kauai County	3.7	6.1	7.1	9.1	10.3	12.7
Maui County	11.1	13.4	16.4	19.8	23.3	26.4
Total hotel units 1/	65.9	76.5	88.7	102.7	116.8	132.8
Oahu	38.6	41.5	45.4	49.4	52.7	55.8
Hawaii County	7.5	10.1	13.2	16.4	21.3	27.1
Kauai County	5.7	8.1	9.5	12.1	13.7	16.9
Maui County	14.2	16.7	20.5	24.7	29.2	33.0

1/ Includes condominiums.

somewhat lower, 1.5 percent annual rate between 1990 and 2010, while recent experience suggests no real growth between 1985 and 1990 (Table 10).

Sugar and Pineapple

Hawaii's two primary agricultural exports are raw sugar and pineapple (processed and fresh). These industries are undergoing a consolidation which began several decades ago and continues today, although at a generally slower rate. The physical output of raw sugar has stabilized at about 1 million tons per year, although price changes have resulted in fluctuating values for this commodity. On the other hand, increasing productivity has permitted this output level to be produced by fewer workers, resulting in a continuously declining level of employment in both the field and processing sectors of the sugar industry.

Pineapple production followed a pattern similar to that of the sugar industry in terms of productivity and, consequently, falling employment levels. However, the sales of the pineapple industry have generally expanded somewhat in more recent years due mainly to the development of the market for fresh pineapple on the Mainland.

The assumptions about the likely future for sugar and pineapple in the new projections differ only marginally from those of previous projections. Rather than holding the value of sugar production constant over the projection period as in the previous projections, the M-K series assumes a slight but consistent annual decline in exports averaging about 1.5 percent through 2010. Productivity gains will likely continue in sugar, resulting in employment declines averaging 2.5 percent per year from 1990 to 2010.

For pineapple, a 0.5 percent annual increase in real sales is projected over the period. Productivity increases in the industry result in an average 1.5 percent annual decline in employment in the pineapple industry over the period.

Other Exports

No significant changes were made in the growth assumptions for other exports from rates in the previous M-F series. Other exports are those for which the export demand is independent of tourism, defense spending, sugar, or pineapple. Growth rates for other exports in the 2000 to 2005 period were generally extended into the 2005 to 2010 period to accommodate the extended horizon of the M-K projections.

Demographic Data and Assumptions

Several modifications were made to the demographic submodel. The submodel was changed to a single-year model and revised to a 1985 base population by age and sex, estimated by the Bureau of the Census. For military personnel and dependents, the age and sex composition in a special tabulation from the 1980 census was used. The age and sex breakdown of civilians other than military dependents was then calculated as a residual. All demographic variables and coefficients were changed to a 1985 basis. Birth and death rates were recalculated for 1985 from official records of the Hawaii State Department of Health. The projected fertility and mortality levels used in the projections were based on revised national projections prepared by the U.S. Bureau of the Census.

Fertility rates (births per 1,000 females of child-bearing age) for Hawaii were assumed to converge with the projected national rates by 2010. Comparison of M-K series, age-specific fertility rates for the year 2005 with the previous M-F rates show some variation. The overall 2005 fertility rates were, however, almost identical. The actual fertility rates for 1985 showed a continued drop and were lower than those projected by series M-F. Consequently, the new series project slightly fewer civilian births than series M-F from 1990 to 2000.

Survival rates for each age-sex group in Hawaii were assumed to change between 1985 and 2005 at the same rate as projected for that group in the nation. Hawaii has had the highest life expectancy at birth of all the

states. In 1985, life expectancy at birth in the U.S. was 71.2 years for males and 78.2 years for females. Corresponding figures for Hawaii were 75.4 and 80.9 years. Projected rates assume continued moderate increases, with life expectancies at birth in 2005 of 76.9 years for males and 82.4 years for females.

Civilian labor force participation rates were likewise revised based on new national projections. The Bureau of Labor Statistics recently released new rates to 2000 which assume a slightly slower growth than previous projections for the nation. The State projections assume that the current Hawaii rates will converge with the national rates in the year 2000 and remain constant to 2010.

Table 10
PROJECTED GROWTH OF MAJOR EXPORTS: 1985 TO 2010

[Series M-K]

Subject	Visitor expenditures	Defense expenditures	Sugar (raw)	Pineapple		
				Total	Processed	Fresh
Value (in millions of 1982 dollars):						
1985	4,210.2	2,641.1	330	175	130	45
1990	6,070.2	2,639.8	310	180	130	50
1995	7,323.5	2,837.1	290	185	130	55
2000	8,556.0	3,049.6	270	190	130	60
2005	9,680.2	3,278.5	250	195	130	65
2010	10,952.4	3,525.1	230	200	130	70
Average annual percent change:						
1985-1990	7.6	0.0	-1.2	0.6	0.0	2.1
1990-1995	3.8	1.5	-1.3	0.5	0.0	1.9
1995-2000	3.2	1.5	-1.4	0.5	0.0	1.8
2000-2005	2.5	1.5	-1.5	0.5	0.0	1.6
2005-2010	2.5	1.5	-1.7	0.5	0.0	1.5

V. Comparison with Previous Projections

These projections are somewhat higher for comparable years than the M-F series published by DBED in 1984, primarily because of upward revisions in the anticipated growth in tourism over the period. Consequently, the resident population projected in the M-F study for 2005 was 1,310,000, 3.0 percent below the new 2005 projection of 1,350,800.

Other organizations that have issued state-level projections to 2000 and beyond include the U.S. Bureau of the Census, U.S. Bureau of Economic Analysis, and the National Planning Association. The NPA projects slower growth for Hawaii, with a 2010 population of 1,307,000, while the Bureau of the Census projection is 1,559,000. The series M-K projection of 1,436,000 in 2010 falls midway between the two forecasts.

Figure 5.
POPULATON PROJECTIONS BY VARIOUS SOURCES: 1985 TO 2010

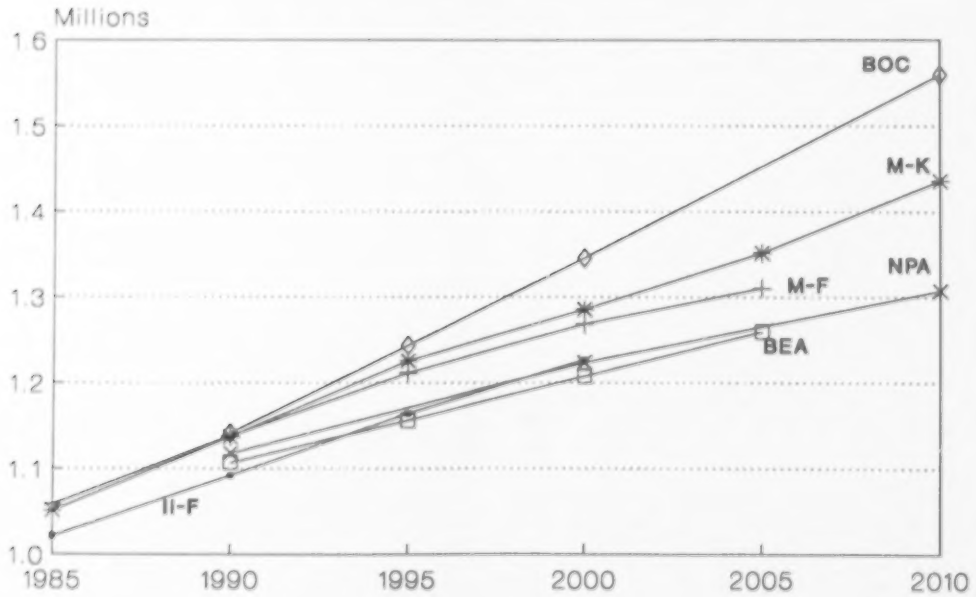


Table 11
RESIDENT POPULATION PROJECTIONS BY VARIOUS SOURCES: 1985 TO 2010

[In thousands. For full citations and additional information on methods and findings, see Statistical Report 199, "Bibliography of Population Forecasts and Projections for Hawaii, 1987."]

Geographic area, source, and date of publication 1/	1985	1990	1995	2000	2005	2010
STATE						
DBED:						
1978 (Series II-F)	1,021	1,092	1,164	1,226	...	...
1984 (Series M-F)	1,058	1,138	1,211	1,268	1,310	...
1988 (Series M-K)	1,051	1,137	1,225	1,285	1,351	1,436
BEA, 1985	...	1,107	1,156	1,207	1,259	...
NPA, 1987	...	1,118	...	1,223	...	1,307
BOC, 1988	...	1,141	1,243	1,345	...	1,559
OAHU						
DBED:						
1978 (Series II-F)	804	845	886	917	...	...
1984 (Series M-F)	815	859	897	926	954	
1988 (Series M-K)	811	862	910	933	961	999
BWS, 1981	804	845	886	947	...	...
DGP, 1983:						
Low	...	...	...	872	...	...
High	...	...	...	963	...	...
BEA, 1985	...	851	883	916	951	...
NPA, 1987	...	849	...	913	...	970
NEIGHBOR ISLANDS						
DBED:						
1978 (Series II-F)	217	246	278	308	...	...
1984 (Series M-F)	243	279	310	342	356	...
1988 (Series M-K)	240	276	315	352	390	436
BEA, 1985	...	256	273	291	308	...
NPA, 1987	...	269	...	310	...	337

1/ Abbreviations are as follows:
BEA - U.S. Bureau of Economic Analysis.
BOC - U.S. Bureau of the Census.
BWS - Board of Water Supply.
DBED - Dept. of Business and Economic Development, formerly Dept. of Planning and Economic Development.
DGP - City & County of Honolulu, Dept. of General Planning.
NPA - National Planning Association.